Mixing properties of aluminosilicate garnets: constraints from natural and experimental data, and applications to geothermo-barometry: Clarifications

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In this paper (Ganguly and Saxena, 1984) we have developed a restricted formulation for garnet–biotite geothermometry by introducing certain corrections for compositional effects on the $K_p$(Fe–Mg) vs. $T$ calibration of Ferry and Spear (1978) in the Fe–Mg system. To use this formulation, one needs to evaluate, according to (14), the compositionally dependent interaction parameter $W_{FeMg}$ in equations (12) and (13) for the garnet composition in the sample of interest and for that (Al$_{96}$Py$_{10}$) maintained in the experimental work of Ferry and Spear, respectively. Thus, $W_{FeMg}$ (eqn. 13) $\approx$ 2270 cal, and consequently, the term $A$ (eqn. 12) $\approx$ 1175 + 9.45 $P$(kbar). The term $W_{Fe}$ in equation (12) is to be read as $\Delta W_{Fe}$.

The $W$ parameters in equations (A.1) and (A.2) in the Appendix are $W_{O}$’s (see eqn. 5). The equation (A.3) is for 1 bar, $T R T log_c(Gt)$ at $P > 1$ bar can be calculated through the relation $RT \partial log_c(P) / \partial P = (V_1 - V_G)$. The volume data for grossular are given in Newton and Haselton (1981), and those for pyrope in Haselton and Newton (1980).

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References


